

---

## **V. ENVIRONMENTAL IMPACT ANALYSIS**

### **F. HYDROLOGY**

---

This section is based on the Drainage Master Plan Study prepared by Kimley-Horn and Associates, Inc. dated December 2003, which is included as Appendix M of this EIR.

#### **1. ENVIRONMENTAL SETTING**

##### **a. Existing Conditions**

The PacifiCenter site is located in an area of relatively flat topography that maintains an average grade of approximately 0.4 percent. The site is predominantly industrial in nature, with impervious surfaces constituting much of the site. Until recently, impervious surfaces comprised approximately 98 percent of the site. As demolition activities associated with the remediation program have begun within portions of the site, additional pervious surfaces are being created. Recent and existing impervious surfaces include buildings, internal streets, and parking areas. Pervious surfaces consist of landscaped areas primarily located on the northern, eastern, and southeastern perimeters of the site as well as areas in which buildings have recently been removed. There are no water bodies on the PacifiCenter site. The area surrounding the project site contains a mix of uses, including residential and commercial, that consist largely of impervious surfaces. Landscaped areas and open space associated with the Lakewood Country Club and Skylinks Golf Courses are the only predominantly pervious surfaces in the project vicinity.

Subsurface materials encountered on the site consist primarily of interlayered mixtures of sand, silt, and clay to the maximum explored depth of approximately 61.5 feet. Granular materials have varied percolation capabilities and are typically medium dense to very dense, and the fine-grained soils are typically stiff to hard. Layers of loose and silty sand were also encountered in previous borings associated with the separate remediation program. Groundwater was encountered at depths of 37 to 45 feet below the ground surface (bgs) in the deeper borings. However, based on available information, it is expected that groundwater levels fluctuate throughout the site.

The average annual precipitation on the PacifiCenter site is 12 inches. A 50-year, 24-hour storm event yields approximately 6.5 inches of rainfall and a 10-year, 24-hour storm event yields approximately 5.8 inches.<sup>177</sup> Most of the surface runoff from the PacifiCenter site is generated on-site, with almost no surface flow entering the site from other areas. On-site runoff flows from at-grade surfaces to storm drains or from the roofs of the existing buildings through roof down-drains that connect to the storm drain system. Concentrated off-site drainage from the Lakewood Country Club and a portion of the residential area located to the north of the project site enters the on-site storm drain system at the project boundary. This is the only off-site drainage that is conveyed through the site, and since this flow is isolated in a culvert, it does not impact the surface runoff on the project site.

The PacifiCenter site lies at the downstream end of a watershed consisting of approximately 2.4 square miles (1,521 acres). This watershed is divided into three sub-basins consisting of: (1) the 261-acre PacifiCenter site; (2) the 257-acre Lakewood Country Club site and surrounding area; and (3) the remaining 1,003 acres located to the north and west of the project site. Runoff from the 1,003-acre sub-basin bypasses the PacifiCenter site. The watershed and sub-basin boundaries are illustrated in Figure 46 on page 394. This watershed is almost completely built out, with a large percentage consisting of impervious surfaces. The primary exception is the Lakewood Country Club Golf Course. The sub-basin that includes this golf course is comprised of approximately 73 acres of residential area, with an assumed impervious area of approximately 70 percent. The remaining 184 acres are assumed to be approximately 10 percent impervious.

The existing storm drain system that serves the 1,521-acre watershed is also illustrated in Figure 46. This watershed is primarily served by the Los Angeles County Flood Control District (LACFCD)-owned “Line A” and “Line B” and the City of Long Beach line that follows 37<sup>th</sup> Street, as depicted in Figure 46. The watershed sub-basin comprised of the 261-acre project site is served by three major drainage facilities, as described below:

- **LACFCD Corrugated Metal Pipe (CMP) Drains:**<sup>178</sup> These two 48-inch culverts, which were constructed in 1937, drain the Lakewood Country Club

<sup>177</sup> Los Angeles County Department of Public Works, *Hydrology Manual*, December 1991.

<sup>178</sup> LACFCD does not require that the existing capacity of LACFCD-owned facilities be analyzed if runoff associated with the proposed condition would be less than runoff associated with the existing condition and the outlet points are the same. The project meets both criteria, so the capacity of drains owned by LACFCD are not deemed to be relevant to this analysis.

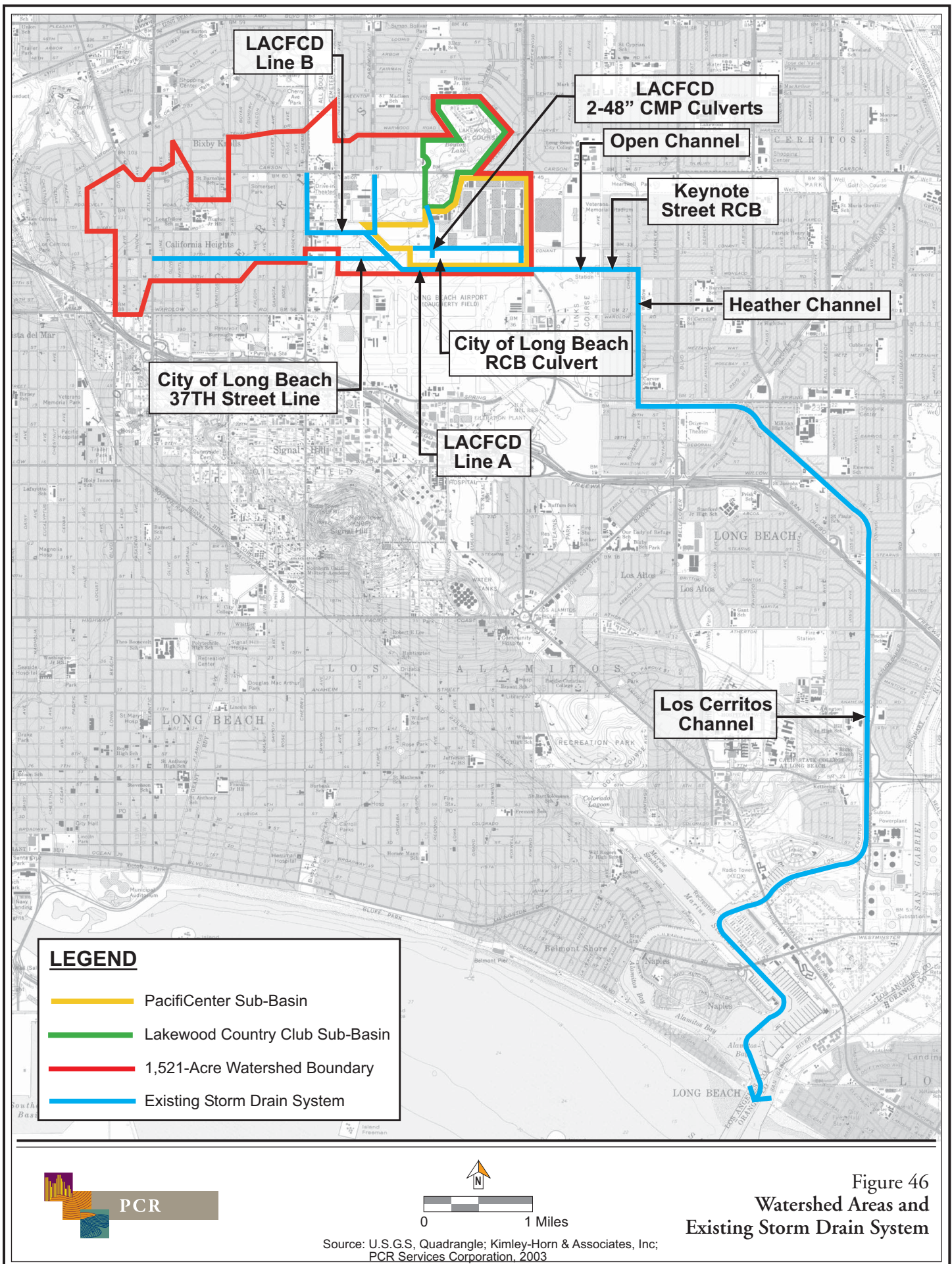


Figure 46  
Watershed Areas and  
Existing Storm Drain System



sub-basin, which includes a portion of the residential area north of the project site. These drains initially run diagonally from the northwestern boundary of the project site, and continue in a north-south direction until they discharge to the City of Long Beach Reinforced Concrete Box (RCB) drain described below.

- City of Long Beach RCB Drain:** This drain, which runs in an east-west direction along the extension of Conant Street near the southern boundary of the project site, consists of an RCB that is 7 feet wide and 4.5 feet deep. The line serves the 261-acre PacifiCenter site, the 257-acre Golf Course sub-basin (via LACFCD's double 48-inch culverts), and an additional 13-acre off-site area comprised of a portion of the Airport property and adjacent streets. Built in the 1940s, the system was designed using different hydraulic methodologies and criteria than are used today. As such, the flow rates for this drain vary between studies and range from 263 cubic feet per second (cfs) to 542 cfs.<sup>179</sup> This drain discharges into a larger RCB culvert owned by LACFCD (Line A), described below. Under baseline conditions, the Long Beach line does not have sufficient capacity for larger event storm flows, and excess surface runoff flows onto the airport property to the south, then flows easterly to Lakewood Boulevard.
- LACFCD RCB Drain (Line A):** This drain was built in 1960 and is located along the southern boundary of the project site. This drain is 9 feet wide and 7.5 feet deep, increasing to 9.75 feet by 8 feet near Lakewood Boulevard, and intercepts flow from the project site (via the City's 7-foot by 4.5-foot RCB drain) as well as from the rest of the 1,521-acre watershed. Surface flows from the southernmost portion of the project site drain directly to Line A.

The on-site storm drain system point of discharge is located at the southeast corner of the site, where flows discharge into LACFCD-owned, double 9.25-foot by 8-foot RCB culverts located under Lakewood Boulevard, as shown in Figure 47 on page 396. The hydraulic capacity of these culverts is 900 cfs and the peak 10-year flow is 910.3 cfs, resulting in a 10.3 cfs deficit.<sup>180</sup> Of this peak flow at Lakewood Boulevard, 673.6 cfs comes from 1,068 acres that drain directly into the LACFCD RCB culvert (Line A), and 236.7 cfs

<sup>179</sup> *The City of Long Beach RCB Drain was originally designed for a capacity of 263 cfs. The calculated maximum hydraulic capacity of the drain is 280 cfs. The 1991 Long Beach Storm Drain Master Plan calculated a 10-year flow of 388 cfs using standard Rational Method hydraulic analysis. The 10-year flow rates calculated for this analysis by Kimley-Horn and Associates, Inc., using LACFCD methodologies, was 542 cfs.*

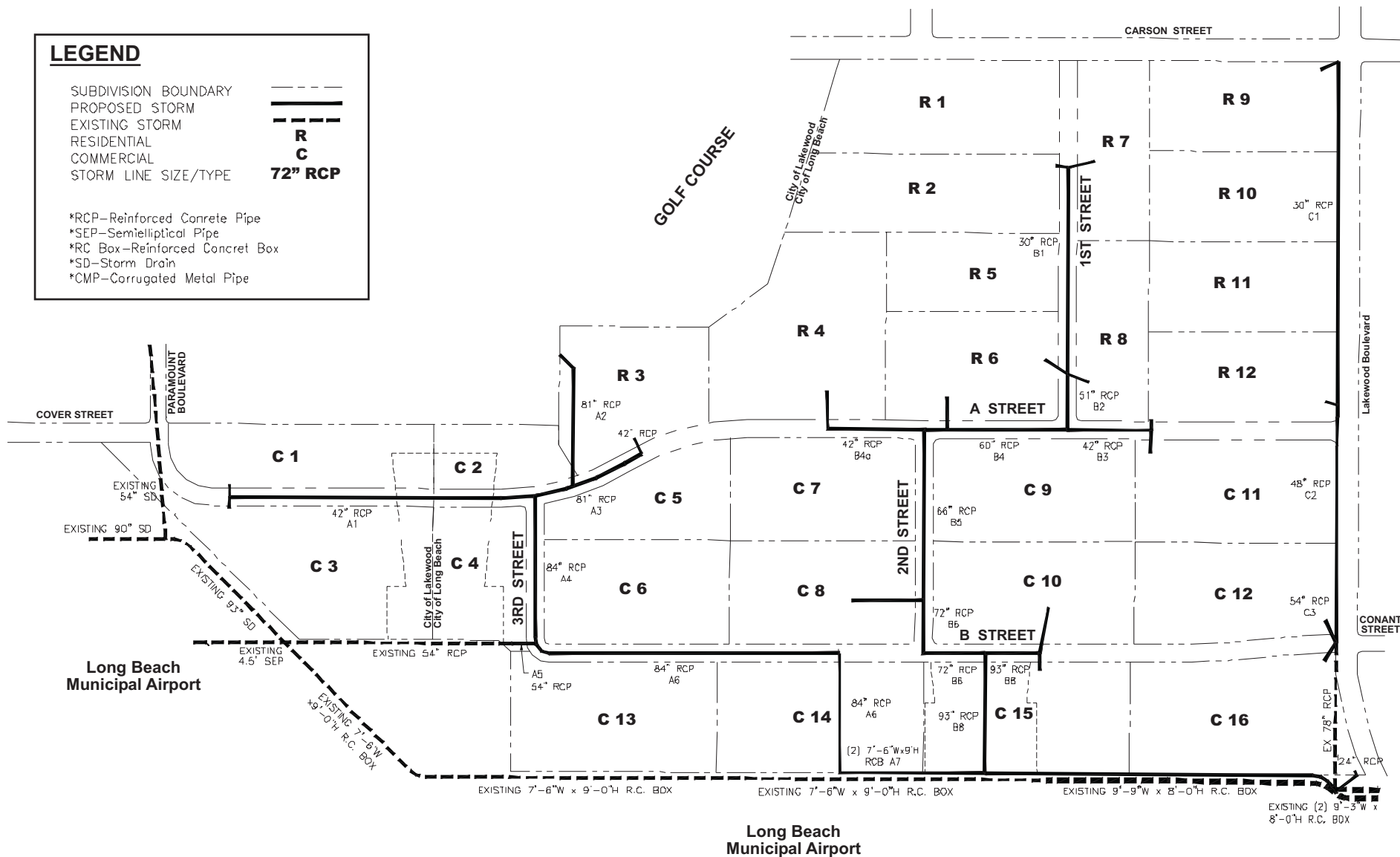
<sup>180</sup> *The peak flow calculation is from the 1964 Drainage Study, which is the most recent and comprehensive hydrologic study available for the watershed.*

## LEGEND

SUBDIVISION BOUNDARY  
 PROPOSED STORM  
 EXISTING STORM  
 RESIDENTIAL  
 COMMERCIAL  
 STORM LINE SIZE/TYPE

**R**  
**C**  
**72" RCP**

\*RCP-Reinforced Concrete Pipe  
 \*SEP-Semielliptical Pipe  
 \*RC Box-Reinforced Concrete Box  
 \*SD-Storm Drain  
 \*CMP-Corrugated Metal Pipe



Scale Not Provided

Source: Kimley-Horn and Associates Inc., 2003

Figure 47  
 Existing and Proposed  
 Storm Drain Systems

comes from the City of Long Beach RCB culvert that drains the project site and the Lakewood Golf Course. These double culverts thus intercept flow from the entire watershed, including the project site and areas in Lakewood and Long Beach to the north, west, and northwest of the project site. As these culverts cross under Lakewood Boulevard, they discharge into an open channel that flows east into a RCB culvert in Keynote Street. This culvert discharges into the Heather Channel, which is a concrete rectangular channel. The Heather Channel discharges into Los Cerritos Channel, which flows into Long Beach Marina, Alamitos Bay, and San Pedro Bay.

The 531-acre hydrologic basin, including the project site, the Lakewood Country Club sub-basin, and an additional 13-acre off-site area, currently generates approximately 613 cfs during a 10-year storm event, 704 cfs during a 25-year storm event, and 792 cfs during a 50-year storm event. The 261-acre project site generates approximately 542 cfs during a 10-year storm event, 616 cfs during a 25-year storm event, and 704 cfs during a 50-year storm event. Based on these flow volumes and considering that only approximately 237 cfs of runoff drains from the Long Beach RCB culvert to the LACFCD double culverts under Lakewood Boulevard, under baseline conditions the excess runoff that cannot be accommodated by the double culverts flows over land to the Airport property to the south, then easterly to Lakewood Boulevard. For a 10-year storm event, approximately 376 cfs of stormwater flows onto the Airport property; the amount of excess runoff flowing over land is greater for 25-year and 50-year storms.

A small portion of the 100-year floodplain currently extends west across Lakewood Boulevard into the PacifiCenter site, as shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM). However, a Conditional Letter of Map Revision (CLOMR) is currently being prepared which will remove this portion of the project site from the map.<sup>181</sup> The CLOMR is a standard procedure for removing areas from FEMA maps that are incorrectly shown as part of the 100-year floodplain. As in this case, such errors are typically caused by topographic mapping that is not detailed enough to accurately show the floodplain limits relative to the existing ground elevations.

## **b. Regulatory Framework**

The City of Long Beach and the City of Lakewood both refer to the Los Angeles County Department of Public Works (LACDPW) Hydrology and Hydraulic Design Manuals for storm drain planning and design calculations. The LACDPW requires that a storm drain conveyance system is designed for a 25-year storm event and that the combined

<sup>181</sup> As of January 2004, the status of the CLOMR is still pending.

capacity of the storm drain and street flow is able to convey a 50-year storm event. In areas with a sump condition, the conveyance system shall be designed for a 50-year storm event. All drainage improvements in the project vicinity are subject to review and approval by LACDPW and the Public Works Department of either the City of Long Beach or the City of Lakewood, as appropriate.

The National Flood Insurance Act of 1968 established the National Flood Insurance Program, which is based on the minimal requirements for floodplain management in the Code of Federal Regulations 44, Sections 59-77. The Federal Regulations are designed to minimize flood damage within Special Flood Hazard Areas. Based on the current FIRM from FEMA, a small portion of the project site is located within a 100-year floodplain. However, as previously mentioned, the process to have this area removed from the map is currently underway.

A National Pollutant Discharge Elimination System (NPDES) permit is required within new construction areas. The City of Long Beach addresses NPDES requirements in Chapter 18.95 of the Long Beach Municipal Code. Although most of this Ordinance pertains to water quality issues, requirements relating to peak runoff rates and the design of impervious surface parking areas are included. In addition, erosion control plans must be submitted to the City of Long Beach for approval before construction is initiated. For a more detailed discussion of NPDES requirements and erosion control plans, refer to Section V.G., Water Quality, of this EIR.

## 2. ENVIRONMENTAL IMPACTS

### a. Methodology

The LACFCD models “TC” and “MORA” were used for the hydrologic analyses.<sup>182</sup> A hydrologic model for both the existing and proposed conditions of the 261-acre PacifiCenter sub-basin, the 257-acre Lakewood Country Club sub-basin, and the adjacent 13-acre off-site area (together comprising a 531-acre watershed) was prepared using this methodology for 10-, 25-, and 50-year storm events. The analysis of the Lakewood Country Club sub-basin was prepared in order to identify flows that pass through the site to the existing City of Long Beach RCB culvert that will be replaced with implementation of

<sup>182</sup> “TC” calculates the time of concentration for a specified storm event for the watershed. The time of concentration of a sub-area is the total travel time of the flow from the sub-area over the longest time-path of the sub-area. “MORA” calculates a runoff rate for the watershed. Refer to the Drainage Master Plan Study in Appendix L for further discussion of these models.

the project. Hydraulic analyses were also performed for the existing on-site RCB culverts to confirm their hydraulic capacity.

In addition, the PacifiCenter site was analyzed as an independent watershed basin since very little off-site surface flow enters the site. For analysis of baseline conditions, the site was divided into 12 sub-basins ranging in size from 9 acres to 38 acres, based on the layout of the current storm drain system. Under project conditions, 23 major sub-basins ranging in size from 3 acres to 32 acres were identified within the project site. These major sub-basins were further divided into smaller basins to reflect the flow going into each major new storm drain on the site. The 10-, 25-, and 50-year storm events were then calculated using the LACFCD model.

Potential impacts to the storm drain system were analyzed by comparing the calculated runoff resulting from project implementation to the calculated drainage flow capacity of the proposed storm drain system during 10-, 25-, and 50-year storm events. Potential off-site flooding impacts were analyzed by comparing the project's potential incremental contribution to downstream flows to the overall capacity of the channel.

#### **b. Thresholds of Significance**

For purposes of this analysis, hydrology impacts will be considered significant if the project will:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site;
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;



- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map; or
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.

### c. Project Features

The proposed project will involve improvements to the existing on-site drainage system, as well as construction of new drainage facilities to support the project, as shown in Figure 47 on page 396. The following Project Features will be implemented as part of project development:

- Portions of the existing Long Beach 7-foot by 4.5-foot RCB culvert located in the Conant Street extension will be replaced. This line's current location is not compatible with the alignment of the proposed on-site street network and its existing vertical alignment will interfere with proposed sewer line improvements within the site. Insofar as the existing uses within the 48-acre Boeing Enclave area of the site remain in operation, the upper 1,200-foot reach of the RCB will remain in place and will continue to drain the western portion of the project site, including the project area within the City of Lakewood. The easternmost 3,900 feet of the culvert will be removed and replaced with a new RCB culvert of varying dimensions at the southern edge of the site, parallel to the existing LACFCD Line A. The proposed RCB line will be designed to convey a 25-year storm flow from the improved site. Additional flows from a greater storm event will be conveyed over land to the airport property to the south, then easterly to Lakewood Boulevard, as occurs under existing conditions.<sup>183</sup>
- A new transition structure immediately upstream from the existing double 9.25-foot by 8-foot RCB culverts under Lakewood Boulevard will join the new RCB culvert along the southern site boundary and the existing LACFCD Line A.

The existing double 48-inch CMP storm drain lines that extend from the Lakewood Country Club Golf Course southerly to the existing 7-foot by 4.5-foot RCB will be removed and replaced with a new 81-inch reinforced concrete pipe (RCP), as shown in Figure 47. This new drain will extend southerly from the

<sup>183</sup> The LACFCD will allow only 237 cfs to discharge from the proposed RCB line into the double 9.25-foot by 8-foot RCB culverts under Lakewood Boulevard. Refer to the analysis below for further discussion.

existing point of connection at the Country Club boundary and connect to the new RCB line along the southern site boundary.

- New public (RCP) storm drains will be constructed within north-south utility corridors throughout the site in order to convey storm flows to the proposed RCB line along the southern site boundary.
- A new storm drain will be constructed along the eastern boundary of the site to drain the Lakewood Boulevard frontage. This storm drain will be located in a dedicated easement parallel to Lakewood Boulevard and will connect into the proposed RCB along the southern site boundary.
- In an effort to minimize the potential impact of street flooding within the PacifiCenter site, all new on-site storm drains, with the exception of the RCB drain along the southern site boundary, will be sized to convey a 25-year storm event, with the street right-of-ways accommodating a 50-year storm event.<sup>184</sup> Please refer to Table 22 on page 402 for a summary of the major facilities of the proposed on-site storm drain system.<sup>185</sup>
- Typical drainage improvements, such as catch basins, roof drains, and surface parking drains, will also be constructed. Such improvements will be designed in accordance with standard engineering practices.

#### **d. Analysis of Project Impacts**

Implementation of the PacifiCenter project will create a mixed-use environment with increased green space in the form of recreational areas, parks, and landscaped setbacks, parkways, and medians. The new landscaped areas will decrease the amount of impervious surface area on the PacifiCenter site. The project will include the dedication of approximately 51 acres to parks, green space, and outdoor landscaped areas. This represents an increase of 47 acres of pervious surfaces on the site, which will allow for percolation of surface water, thereby reducing runoff rates when compared with recent conditions on the project site prior to the initiation of demolition activities associated with the remediation program in January 2003 within a portion of the site. As such, the project will result in a decrease in the amount of stormwater runoff generated from the site when compared with historic site conditions. The amount of runoff originating from the site

<sup>184</sup> *Except in a sump condition, in which case drain(s) will be designed to convey a 50-year storm event.*

<sup>185</sup> *The locations and sizes of the proposed drainage facilities are preliminary and may vary somewhat with future modifications to the project such as street layout, grading, or land use.*

Table 22

**PROPOSED STORM DRAIN SYSTEM <sup>a</sup>**

<b>Storm Drain</b>	<b>Size <sup>b</sup> (Dia. or WxD)</b>	<b>Length (ft)</b>	<b>Slope (ft/ft)</b>	<b>Capacity (cfs)</b>
Line A1	42"	1,460	0.002	29
Line A2	81"	600	0.005	258
Line A3	81"	600	0.004	273
Line A4	84"	660	0.009	300
Line A5	54"	140	0.004	47
Line A6	84"	1,540	0.003	335
Line B1	30"	1,000	0.009	19
Line B2	51"	500	0.006	81
Line B3	42"	500	0.006	41
Line B4	60"	650	0.006	120
Line B5	66"	780	0.008	148
Line B6	72"	860	0.006	203
Line B7	51"	460	0.007	70
Line B8	93"	540	0.007	562
Line C1	30"	1,680	0.005	14
Line C2	48"	1,060	0.005	45
Line C3	54"	180	0.009	89
Double RCB A7	7'6" x 9'	3,000	0.001	626

<sup>a</sup> Refer to Figure 47 for an illustration of the proposed storm drain system.

<sup>b</sup> The precise locations and sizes of the proposed drainage facilities are preliminary and may vary somewhat with future modifications to the project such as street layout, grading, or land use.

*Dia. or WxD = diameter or width x depth*

*ft = feet*

*ft/ft = feet/feet (slope = rise ÷ run)*

*cfs = cubic feet per second*

*Source: Kimley Horn and Associates, Inc., December 2003.*

during a 10-year storm event prior to initiation of demolition activities was approximately 542 cfs. With implementation of the proposed project, flows associated with a 10-year storm event will be approximately 403 cfs. The result is a net reduction of 139 cfs in stormwater runoff. This reduction, in turn, will result in a decrease in the amount of stormwater runoff that is generated from the entire 531-acre hydrologic basin, which includes the project site and the Lakewood Country Club sub-basin. Currently, flows during a 10-year storm event for this area total approximately 613 cfs. With project

implementation, flows associated with a 10-year storm event will be 454 cfs, resulting in a net reduction of 159 cfs in stormwater runoff. This decrease in runoff will also reduce the potential for off-site flood hazards. Refer to Table 23 on page 404 for a summary of the peak flows from the PacifiCenter site and the larger 531-acre hydrologic basin during 10-, 25-, and 50-year storm events under recent and proposed conditions, and the associated runoff reductions that will occur with implementation of the project.

As discussed above, the existing double 9.25-foot by 8-foot RCB culverts located under Lakewood Boulevard have a hydraulic capacity of 900 cfs. However, the LACFCD has specified that discharges to these facilities from the proposed RCB line along the southern site boundary should be restricted to 237 cfs. With estimated runoff flows of 454 cfs associated with the 531-acre hydrologic basin, as indicated in Table 23, an excess 217 cfs cannot be accommodated by the double culverts. This excess runoff will flow over land to the Airport property to the south, then easterly to Lakewood Boulevard, as occurs under baseline conditions. The amount of excess runoff flowing over land will be greater for 25-year and 50-year storm events. When compared with recent conditions on the project site prior to initiation of demolition activities in association with the remediation program within a portion of the site, a net reduction in the amount of site-generated surface runoff flowing onto the adjacent Airport property will occur, as approximately 376 cfs of stormwater flows onto the Airport during a 10-year storm event under baseline conditions. Thus, when compared with recent site conditions, implementation of the project will result in a benefit in terms of storm drain capacity. Nonetheless, the generation of project-related surface water flows that exceed the capacity of the double RCB culverts under Lakewood Boulevard during a 10-year storm event is considered a significant impact.

In addition to the decrease in the overall amount of stormwater runoff, the project will replace the existing runoff that is associated with industrial uses with runoff associated with a variety of less intensive mixed uses. Please refer to Section V.G., Water Quality, of this EIR for a discussion of issues associated with the quality of runoff. As indicated above, a small portion of the 100-year floodplain currently extends west across Lakewood Boulevard into the PacifiCenter site, as shown on the FEMA Flood Insurance Rate Map. However, a Conditional Letter of Map Revision is currently being prepared, which will remove this portion of the project site from the map. In addition, the project site is not located in an area susceptible to inundation from dam failure. Thus, impacts associated with a 100-year floodplain or dam failure will be less than significant.

The project will install and improve a number of culverts, transition structures, and storm drains (see Subsection 2.c. above). In the event contaminated soils are encountered during the installation and improvement of these features, appropriate

**Table 23**  
**RECENT AND PROPOSED PEAK FLOW CONDITIONS**

<b>531-Acre Hydrologic Basin</b>				
<b>Storm Event (Year)</b>	<b>Recent Condition (cfs)</b>	<b>Proposed Condition (cfs)</b>	<b>Reduction (cfs)</b>	<b>Percent Decrease</b>
10	613	454	159	26%
25	704	535	169	24%
30	792	626	166	21%
<b>261-Acre PacifiCenter Site</b>				
10	542	403	139	26%
25	616	457	159	26%
30	704	529	175	25%

*Source: Kimley-Horn and Associates, Inc., December 2003.*

measures shall be taken for the cleanup and/or disposal of the soil as set forth in Section V.E, Hazards and Hazardous Materials, of this EIR, including the Risk Management Plan (RMP) set forth therein. In addition, the applicant, through the measures set forth in the RMP, will assure that the installation of these features will remain protective of the health and safety of future residents of the PacifiCenter project and not interfere with the remedial measures conducted in conformance with Clean-Up and Abatement Order 95-048 by the California Regional Water Quality Control Board – Los Angeles Region. As the installation of these drainage facilities will be incorporated as part of the project, potential impacts associated with the installation, such as those related to grading and hazardous materials, are discussed throughout this EIR. Therefore, while the project will result in the construction of new stormwater drainage facilities, the construction of such facilities will not cause significant environmental effects.

As previously discussed, the FIRM prepared by FEMA currently indicates that a portion of the project site is located within the 100-year floodplain. However, it has been determined that this mapping is incorrect and, as a result, a CLOMR is currently being prepared to remove this portion of the project site from the map. Therefore, no significant impacts associated with the placement of housing or structures within a 100-year flood hazard area will occur.

In summary, improvements to the existing storm drain system, as proposed under the project, will result in a beneficial impact as such improvements will replace the aging, deficient system that currently serves the project site. The on-site drainage facilities will be integrated with the overall drainage system serving the entire watershed and will not

impede downstream flow capacities. Additionally, the project will not substantially alter the existing drainage pattern of the site or area or substantially increase the rate or amount of surface runoff in a manner that would result in substantial erosion or siltation on- or off-site or in flooding on- or off-site. The decrease in the amount of runoff originating from the project site due to the increase in pervious surfaces will result in a beneficial impact. However, since the downstream double RCB culverts are not adequate for project storm flows, the project will contribute runoff water that will exceed the capacity of existing or planned stormwater drainage systems and thus, a significant hydrology impact will occur.

### **3. CUMULATIVE IMPACTS**

The geographic area for the cumulative analysis of hydrologic impacts is defined as the 1,521-acre watershed in which the project site is located. The watershed and its sub-basin boundaries are illustrated in Figure 46 on page 394. The area that encompasses this watershed is nearly completely built out. As discussed above, with the exception of the Lakewood Country Club golf course, the sub-basins comprising the watershed range from approximately 10 percent imperviousness to approximately 70 percent imperviousness (within the residential areas north and west of the project site). Approximately seven related projects (Related Project Nos. 6, 12, 44, 50, 57, 61, and 75) are located within the watershed. No land use changes that will substantially increase the amount of impervious surface are expected, as any changes in land uses associated with the related projects will consist of redevelopment of previously developed sites.

Evaluation of the PacifiCenter project in conjunction with the ongoing on-site soil and groundwater remediation program (Related Project No. 44) indicates that while the remediation activities will ultimately result in the removal of a substantial amount of impervious surfaces, the project will nonetheless result in a decrease in impervious surface area relative to baseline (pre-remediation) conditions. Although the project will decrease the amount of runoff originating from the PacifiCenter site, site-generated runoff will continue to exceed the capacity of the double RCB culverts under Lakewood Boulevard, and a significant project impact will occur. Any of the related projects located within the 1,521-acre watershed could also generate stormwater flows that contribute to the capacity shortage of the double RCB culverts. As such, implementation of the proposed project in combination with the related projects will result in a significant cumulative impact.



#### 4. MITIGATION MEASURES

Based on the analysis provided above, development of the proposed project will result in significant hydrology impacts. Thus, the following mitigation measures will be required:

- V.F-1 On-site drainage system improvements shall be completed in accordance with the requirements of the City of Long Beach Department of Public Works and the City of Lakewood Department of Public Works and shall be coordinated with PacifiCenter development and on-site street improvements.

**Monitoring Phase:** Pre-Construction

**Enforcement Agency:** City of Long Beach Department of Public Works and City of Lakewood Department of Public Works

**Monitoring Agency:** City of Long Beach Department of Public Works and City of Lakewood Department of Public Works

**Action Indicating Compliance:** Approval of Plans/Issuance of building permits

- V.F-2 All new on-site storm drains, with the exception of the RCB drain along the southern site boundary, shall be sized to convey a 25-year storm event with the street right-of-ways accommodating a 50-year storm event.<sup>186</sup>

**Monitoring Phase:** Pre-Construction

**Enforcement Agency:** City of Long Beach Department of Public Works and City of Lakewood Department of Public Works

**Monitoring Agency:** City of Long Beach Department of Public Works and City of Lakewood Department of Public Works

**Action Indicating Compliance:** Approval of Plans/issuance of building permits

<sup>186</sup> Except in a sump condition, in which drain(s) will be designed to convey a 50-year storm event.

## **5. SIGNIFICANCE AFTER MITIGATION**

As discussed above, although the project will result in a net reduction in flows in the area, the existing double RCB culverts under Lakewood Boulevard are not adequate for the storm flows generated from the project site, as is the case with existing flows to these RCBs. Given the size and length of these facilities, measures to mitigate the capacity shortage are infeasible. Therefore, a significant and unavoidable impact relative to hydrology will occur.